

Work Order ID 55131

January 6, 2010 3:48:36 PM

Page 1

Item ID: D412-664-203

Accept

Setup Start

Revision ID:

Stop

Item Name: Crosstube Aft

Start Date: 1/7/2010 Start Qty: 1.00

Required Date: 3/01/2010 Req'd Qty: 1.00

Cust Item ID:

Customer:

Reference:

Run Start

Approvals:

Process Plan:

Date: 10-1-06

Tooling:

Date:

QC:

Date:

SPC (Y/N):

Date:

Stop

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Draw Number	Draw Rev.	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
Draw Nbr	Revision Nbr								
D412-664-243	E								
100	DOCUMENT CONTROL	0.00							
DC	Memo	0.00							
Document Control	Photocopy bluefile and create labels as per PPP D412-664-203 CHG 006								
110	Packaging	0.00							
Packaging	Memo	0.00							
Packaging									
120	BENDING MACHINE - CROSSTUBES	0.00							
CNC Bend 2	Memo	0.00							
CNC Alpha 160 Bender	Bend tube as per Dwg D412-664-243 using CNC bender program 412-af and Folio FT010								

8.10.02.03

HJ for MF 10/02/03

DP

10-1-19

DP

10-1-19

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Work Order ID 55131



Page 2

January 6, 2010 3:48:36 PM

Item ID: D412-664-203

Accept



Setup Start



Revision ID:

Stop



Item Name: Crosstube Aft

Start Date: 07/01/2010 Start Qty: 1.00

Cust Item ID:

Required Date: 28/01/2010 Req'd Qty: 1.00

Customer:

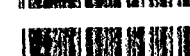
Reference:

Run Start



Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Stop



QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Draw Number	Draw Rev.	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
130 	QC15- Crosstube Dimensional Check	0.00							
QC Quality Control	Memo	0.00							
140 	Crosstubes	0.00							
Crosstubes	Memo	0.00							
Crosstubes	1-Drill pilot holes in tube as per Dwg D412-664-243 using drill Jig DT8550 & DT8551 2-Ream hole to finish size in tube as per Dwg D412-664-243 using drill Jig DT8550 & DT8551. Check dimensions between holes, both sides on both cuffs, to ensure alignment w/								
150 	Crosstubes Chemical Conversion	0.00							
HandFXtube	Memo	0.00							
Hand Finishing Crosstubes									

92 10.01.19

(IX) 2 MB 10-01-20

(IX) 2 MB 10-01-20

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
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January 6, 2010 3:48:36 PM

Page 3

Item ID: D412-664-203

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Setup Start

Revision ID:

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Item Name: Crosstube Aft

Start Date: 07/01/2010 Start Qty: 1.00

Cust Item ID:

Required Date: 28/01/2010 Req'd Qty: 1.00

Customer:

Reference:

Run Start

Approvals:

Process Plan:

Date:

Tooling:

Date:




Stop

QC:

Date:

SPC (Y/N):

Date:

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Draw Number	Draw Rev.	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
160  QC Quality Control	QC3- Inspect Part Finish Memo	0.00 0.00	⇒ S 10/01/21						
170  QC Quality Control	QC5- Inspect part completeness to step on W/O Memo	0.00 0.00	⇒ S 10/01/21			(40)			
180  Outsource2 Outsource process - NDT	Outsource process - NDT per QSI038 4.1 Memo Liquid Penetrant Inspection as per QSI 038 Or <input type="checkbox"/> Issue P/O: 11190 LPI as per ASTM 1417 <input type="checkbox"/> Level 2 Attach copy of NDT results to work order	0.00 0.00						PS 10-1-21 (1)	

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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January 6, 2010 3:48:36 PM

Page 4

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Revision ID:

Stop

Item Name: Crosstube Aft

Start Date: 07/01/2010 Start Qty: 1.00

Cust Item ID:

Required Date: 28/01/2010 Req'd Qty: 1.00

Customer:

Reference:

Run Start

Approvals:

Process Plan:

Date:

Tooling:

Date:

QC:

Date:

SPC (Y/N):

Date:

Stop

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Draw Number	Draw Rev.	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
190	Packaging	0.00							
Packaging	Memo	0.00							
Packaging	Inspect for transit damage. Ensure copy of NDT results attached to work order.								
200	QC5- Inspect part completeness to step on W/O	0.00							
QC	Memo	0.00							
Quality Control	Inspect for damage & ensure results are as per Dwg D412-664-203								
210	SprayPaint	0.00							
SprayPaint	Memo	0.00							
Spray Painting	1-Prime inside and outside crosstube as per QSI 005 4.2. 2-Paint outside crosstube with White Intron as per QSI 005 4.2								
	Time: 8:00 Finish Time: 8:30 PAINT: Start								
	Time: 12:30 Finish Time: 1:30								

10/1/21 (1)

10 01 25 (1)

10 01 29 (1)

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

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Work Order ID 55131



Page 5

January 6, 2010 3:48:36 PM

Item ID: D412-664-203

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Setup Start



Revision ID:

Stop



Item Name: Crosstube Aft

Start Date: 07/01/2010 Start Qty: 1.00



Cust Item ID:

Required Date: 28/01/2010 Req'd Qty: 1.00



Customer:

Reference:

Run Start



Approvals:

Process Plan:

Date:

Tooling:

Date:

Stop



QC:

Date:

SPC (Y/N):

Date:

Sequence ID/
Work Center ID

Operation
Description

Set Up/
Run Hours

Draw
Number

Draw
Rev.

Plan
Code

Accept
Qty

Reject
Qty

Reject
Number

Insp.
Stamp

220

QC14- Inspect Spray Paint

0.00



QC

Memo

0.00

Quality Control

Then, Wrap in plastic bag to protect from scratches

RT 10 02 -01

230

Crosstubes

0.00



Crosstubes

Memo

0.00

Crosstubes

Assemble as per Dwg D412-664-203 ☐ 1- Lightly scuff the bonded area using a 320 grit sand paper and clean the area with 41058 wash 'n' wipe ☐ 2-Install supports with magnobond as per QSI 015 Adhere for for 12 Hrs ☐ A/R 6398 Magnobond Ba 112417 exp: 01/2011 Torque: M 10/02/02

MA 10 02 01 (1)

240

QC5- Inspect part completeness to step on W/O

0.00



QC

Memo

0.00

Quality Control

=> S 10/02/02

(4)

W/O:		WORK ORDER CHANGES					
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Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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Page 6

January 6, 2010 3:48:36 PM

Item ID: D412-664-203

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Setup Start



Revision ID:

Stop



Item Name: Crosstube Aft

Start Date: 07/01/2010 Start Qty: 1.00

Cust Item ID:

Required Date: 28/01/2010 Req'd Qty: 1.00

Customer:

Reference:

Rasn Start



Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Stop



QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Draw Number	Draw Rev.	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	----------------	--------------	--------------	---------------	---------------	------------------	----------------

250

Pick Kit

0.00



Packaging

Memo

0.00

Packaging

10-2-3

[Signature]

260

QC4- 100% Inspect kits for completeness

0.00



QC

Memo

0.00

Quality Control

=> 8/16/03

11

270

Packaging

0.00



Packaging

Memo

0.00

Packaging

Identify and pack for shipping as per PPP D412-664-203 *****Ensure tube is not packaged if curing time is less than 12 hrs, see step 27 for application time & date *****☐ Time & date of packaging: *1/6/2010 @ 12:30 PM* ☐ Location: _____

10-2-3

[Signature]

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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NOTE: Date & initial all entries

Work Order ID 55131

Page 7

January 6, 2010 3:48:36 PM

Item ID: D412-664-203

Accept



Setup Start



Revision ID:

Stop



Item Name: Crosstube Aft

Start Date: 07/01/2010 Start Qty: 1.00



Cust Item ID:

Required Date: 28/01/2010 Req'd Qty: 1.00

Customer:

Reference:

Run Start



Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Stop



QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Draw Number	Draw Rev.	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
280	QC21- Final Inspection - Work Order Release	0.00							
QC	Memo	0.00							
Quality Control									

10/02/04

MF
10-2-4

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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NOTE: Date & initial all entries

Picklist Print

January 6, 2010 3:48:40 PM

Page 1

Work Order ID: 55131

Parent Item: D412-664-203

Parent Item Name: Crosstube Aft

Start Date: 07/01/2010

Required Date: 28/01/2010

Comments:

Start Qty: 1.00

Required Qty: 1.00

Component Item ID/ Item Name	Replacement Item ID	Mag/ Perch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty of Hand	Remaining Qty To Pick	Qty Issued	Date Issued	Status
AN6-40A Bolt		Purchased	No				Each	134.0000	4.0000		10-2-3	sf

Warehouse	Loc Qty	Loc Code
Location		
Main Warehouse		
ST B57718	134	
112612	1	
112679	33	4
112828	50	
113422	50	

AN6-41A
Bolt

Purchased No

Each 106.0000 2.0000

10-2-3 sf

Warehouse	Loc Qty	Loc Code
Location		
Main Warehouse		
ST	106	
111605	11	2
112489	20	
112805	25	
113288	50	

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
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NOTE: Date & initial all entries

Picklist Print

Page 2

January 6, 2010 3:48:40 PM

Work Order ID: 55131

Parent Item: D412-664-203

Parent Item Name: Crosstube Aft

Comments:

Start Date: 07/01/2010

Required Date: 28/01/2010

Start Qty: 1.00

Required Qty: 1.00

Component Item ID Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Remaining Qty To Pick	Qty Issued	Date Issued	Status
AN960JD616 Washer		Purchased	No				Each	669.0000	18.0000			

10-2-3 SP

<u>Warehouse</u>	<u>Loc Qty</u>	<u>Loc Code</u>
<u>Location</u>		
Main Warehouse		
ST	669	
112314	3	
112828	366	
113149	300	

D2856-600

Manufactured No

f

449.9974 1.7600



Abrasion Strip

<u>Warehouse</u>	<u>Loc Qty</u>	<u>Loc Code</u>
<u>Location</u>		
Main Warehouse		
ST	449.9974	
24328	6.73	
25656	87.77	
26650	8.23	
36398	132.2074	
37668	215.06	

m/ 10/02/01

January 6, 2010 3:48:40 PM

Shop Packet Print

Page 2

W/O:		WORK ORDER CHANGES						
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector	

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Picklist Print

January 6, 2010 3:48:40 PM

Work Order ID: 55131

Parent Item: D412-664-203

Parent Item Name: Crosstube Aft

Start Date: 07/01/2010

Required Date: 28/01/2010

Start Qty: 1.00

Required Qty: 1.00

Comments:

Component ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Remaining Qty To Pick	Qty Issued	Rate Issued	Status
D2896-1		Manufactured	No				Each	30.0000	1.0000			



Support

<u>Warehouse</u>	<u>Loc Qty</u>	<u>Loc Code</u>
<u>Location</u>		
Main Warehouse		
ST	30	
43209	10	
47820	20	

m/l 10/02/01

D3189-1

Manufactured No

Each 29.0000 2.0000



Chafing Shield

<u>Warehouse</u>	<u>Loc Qty</u>	<u>Loc Code</u>
<u>Location</u>		
OFFSHORE		
FG	4	
36065	4	
Main Warehouse		
ST	25	
47777	5	
52446	20	

m/l 10/02/01

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Picklist Print

January 6, 2010 3:48:40 PM

Work Order ID: 55131

Parent Item: D412-664-203

Parent Item Name: Crosstube Aft

Start Date: 07/01/2010

Required Date: 28/01/2010

Start Qty: 1.00

Required Qty: 1.00

Comments:

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Remaining Qty To Pick	Qty Issued	Date Issued	Status
D3595-063-570		Manufactured	No				Each	69.0000	4.0000			
RUBBER CUSHION												

Warehouse	Loc Qty	Loc Code
Location		
OFFSHORE		
FG	4	
37971	4	
Main Warehouse		
ST	65	
42243	5	
45509	60	

ml 10/02/01

D412-664-203TRN Manufactured No



Crosstube Turning Detail

Warehouse	Loc Qty	Loc Code
Location		
Main Warehouse		
FG	2	
54147	1	
54148	1	

10-1-19

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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NOTE: Date & initial all entries

Picklist Print

Page 5

January 6, 2010 3:48:40 PM

Work Order ID: 55131

Parent Item: D412-664-203

Parent Item Name: Crosstube Aft



Comments:

Start Date: 07/01/2010

Required Date: 28/01/2010

Start Qty: 1.00

Required Qty: 1.00

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Item Type	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Remaining Qty To Pick	Qty Issued	Date Issued	Status
MS21042L6  Nut		Purchased	No				Each	484.0000	6.0000 		10-2-3 <i>sf</i>	

<u>Warehouse</u>	<u>Loc Qty</u>	<u>Loc Code</u>
<u>Location</u>		
Main Warehouse		
ST	484	
105077	22	
110002	5	
111548	8	
111578	400	
112492	49	

January 6, 2010 3:48:40 PM

Shop Packet Print

Page 5

W/O:		WORK ORDER CHANGES						
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector	

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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Parent Item: D412-664-203

Parent Item Name: Crosstube Aft

Start Date: 07/01/2010

Required Date: 28/01/2010

Start Qty: 1.00

Required Qty: 1.00

Comments:

Component Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Remaining Qty To Pick	Qty Issued	Date Issued	Status
MS21920-28		Purchased	No				Each	138.0000	4.0000			



Clarap(per MIL-DTL-8783C)

Warehouse	Loc Qty	Loc Code
<u>Location</u>		
OFFSHORE		
FG	5	
105884	5	
Main Warehouse		
ST	133	
106864	5	
108466	9	
108847	7	
109181	14	
109965	2	
111281	2	
111734	6	
112624	38	
112863	50	

m/ 10/02/01

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

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Page 7

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Work Order ID: 55131

Parent Item: D412-664-203

Parent Item Name: Crosstube Aft

Start Date: 07/01/2010

Required Date: 28/01/2010

Start Qty: 1.00

Required Qty: 1.00

Comments:

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Remaining Qty To Pick	Qty Issued	Date Issued	Status
MS21920-30		Purchased	No				Each	147.0000	2.0000			



clamp(per MIL-DTL-8783C)

Warehouse

Loc Qty

Loc Code

Location

Main Warehouse

ST

147

107600

3

109181

44

111258

50

112772

50

m/ 10/02/01

January 6, 2010 3:48:40 PM

Shop Packet Print

Page 7

W/O:		WORK ORDER CHANGES					
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Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

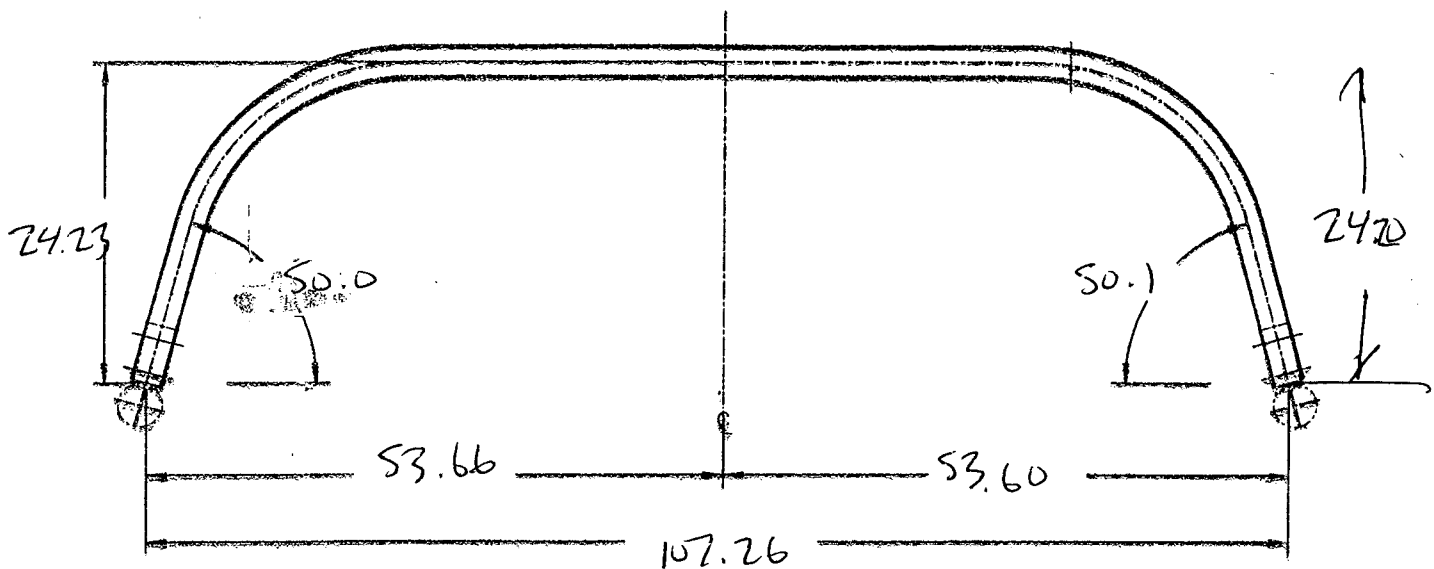
NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

BART AEROSPACE LTD		Work Order:	55731
Description: Creastube High Alt (412)		Part Number:	D412-664-203
Inspection Dwg: D412-664-243	Rev: D E		Page 1 of 1

10.01.19

Required Dimension	Min	Max
Height	24.24	24.50
1/2 Span	53.69	53.85
Angle	49	52
Total Span	107.18	107.70



Comments
Tube is low. Acceptable CP 10.01.19

QC15 Inspection	CP
Date	10.01.19

Rev	Date	Change	Revised by	Approved
A	07.02.06	New Issue	KJ/JM	
B	07.05.08	Dimensions updated per Dwg rev. D	KJ/JLM	

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Item	Qty	Part Number	Description
	-243		
	X	D412-664-243	CROSSTUBE ASSEMBLY (412 HIGH AFT)
	1	D6009-129	CROSSTUBE
	2	D3595-063-570	RUBBER CUSHION
	1	D2896-1	SUPPORT
	2	D3189-1	CHAFING SHIELD
	2	D2856-600-1009	ABRASION STRIP
	4	MS21920-28	CLAMP
	2	MS21920-30	CLAMP (OR MS21920-32)
9	AIR	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRONBELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE)

SHOP COPY
RETURN TO
ENGINEERING
UNCONTROLLED COPY
SUBJECT TO AMENDMENT
WITHOUT NOTICE
WORK ORDER
NO. 55131
PA 10-1-06

GENERAL NOTES:

- MATERIAL: MANUFACTURED FROM D6009-129
FINISHED LENGTH = 124.100±0.020 (BEFORE BENDING/TRIMMING)
- FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART QSI 005 4.2
- TOLERANCES ARE PER DART QSI 016 UNLESS OTHERWISE NOTED.
- UNITS: INCHES UNLESS OTHERWISE NOTED.
- BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- IDENTIFICATION: SCRIBE DART PART NUMBER "D412-664-243" AND BATCH NUMBER ON INSIDE OF CUFF USING VIBRATING STYLUS.
- WEIGHT: 47.0 lbs (PER IN-D212-664)
- PART IS SYMMETRIC ABOUT CENTERLINE.
- RUN CUTTER OFF PART. BLEND OUT EDGE LONGITUDINALLY, TRANSITION SHOULD BE SMOOTH.
- BEND PROGRESSIVELY WITH A MINIMUM OF 8 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D.
- LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.
- INSTALL D2896-1 SUPPORT USING 0.03" TO 0.05" THICK LAYER OF MAGNOBOND 6398 TO THE SURFACE OF D2896-1 THAT WILL BE IN CONTACT WITH THE CROSSTUBE PER QSI 015. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
- INSTALL MS21920-30 CLAMPS (OR -32) WITH D3595-063-570 RUBBER CUSHIONS TO SECURE THE D2896-1 SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS ARE OPPOSITE OF CROSSTUBE SUPPORT.
- INSTALL D2856-600-1009 ABRASION STRIPS WITH A 0.13 REF GAP ON BOTTOM SIDE OF CROSSTUBE PER QSI 035.
- EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.
- TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED OUT AFTER TORQUING.

RELEASED
11 2005-08-24

E	REFORMAT/REVISE GENERAL NOTES; REORGANIZED VIEWS AND REFORMATTED DRAWING TO CURRENT STANDARDS; RELOCATED FLAG/AS PER PAR 08-045 (2N 46-3); ADD TOLERANCE (2N 46-3, C4-3, C5-3 & C5-3); MOVES TURNING DETAIL & UPDATED TOLERANCE TO SHEET 4.	RF	03.06.03
D	REMOVE 02732-058, CHANGE TO D2895-058-570	RF	07.03.09
C	REMOVE 02856-600-1007, ADD D2896-1099-1 MAGNOBOND 6398, MS21920-32 NIPS MS21920-30	W/S	06.10.07
B	ADD HOLES FOR COMPATIBILITY WITH B7MA SKOTUBES	PH	02.02.04
A	NEW ISSUE	PH	01.30.07
REV.	DESCRIPTION	BY	DATE
DESIGN	RF	DART AEROSPACE LTD WARRINGTON, CHESHIRE, ENGLAND DRAWING NO. D412-664-243 SHEET 1 OF 4 TITLE CROSSTUBE ASSEMBLY (412 HIGH AFT) SCALE UNITS DATE 09.09.30	
DRAWN	RF		
CHECKED	RF		
MFG. APPR.	RF		
APPROVED	RF		
DE APPR.	RF		
DATE	09.09.30	<small>COPIES OF THIS DRAWING ARE TO BE KEPT IN THE OFFICE OF THE DESIGN ENGINEER AND IN THE OFFICE OF THE MANUFACTURING ENGINEER. ANY CHANGES TO THIS DRAWING MUST BE APPROVED BY THE DESIGN ENGINEER AND THE MANUFACTURING ENGINEER.</small>	

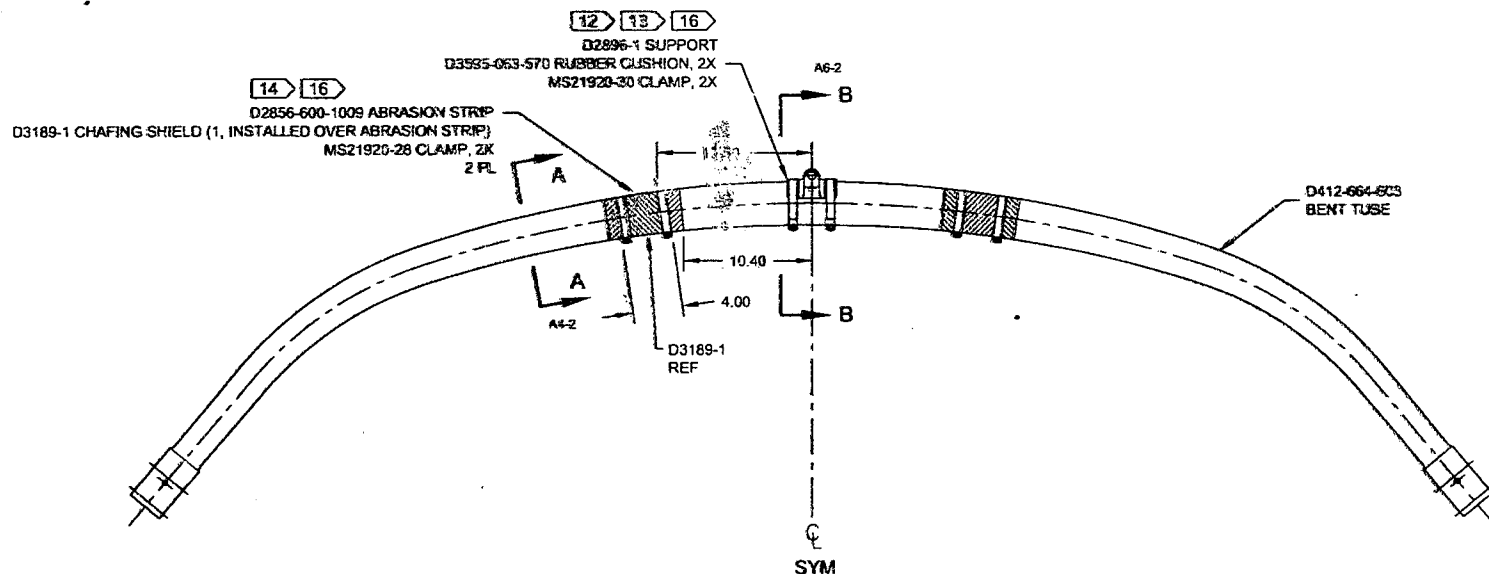
W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

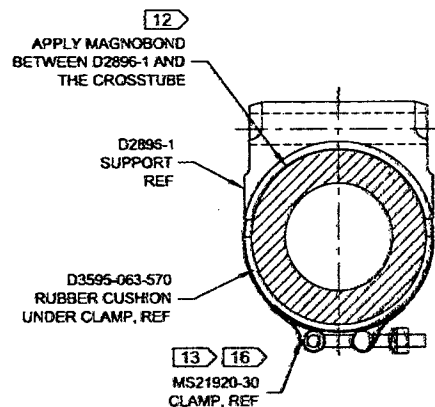
Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

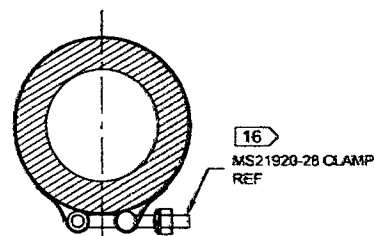
NOTE: Date & initial all entries



D212-664-243
ASSEMBLY DETAIL



SECTION B-B
SCALE 4X

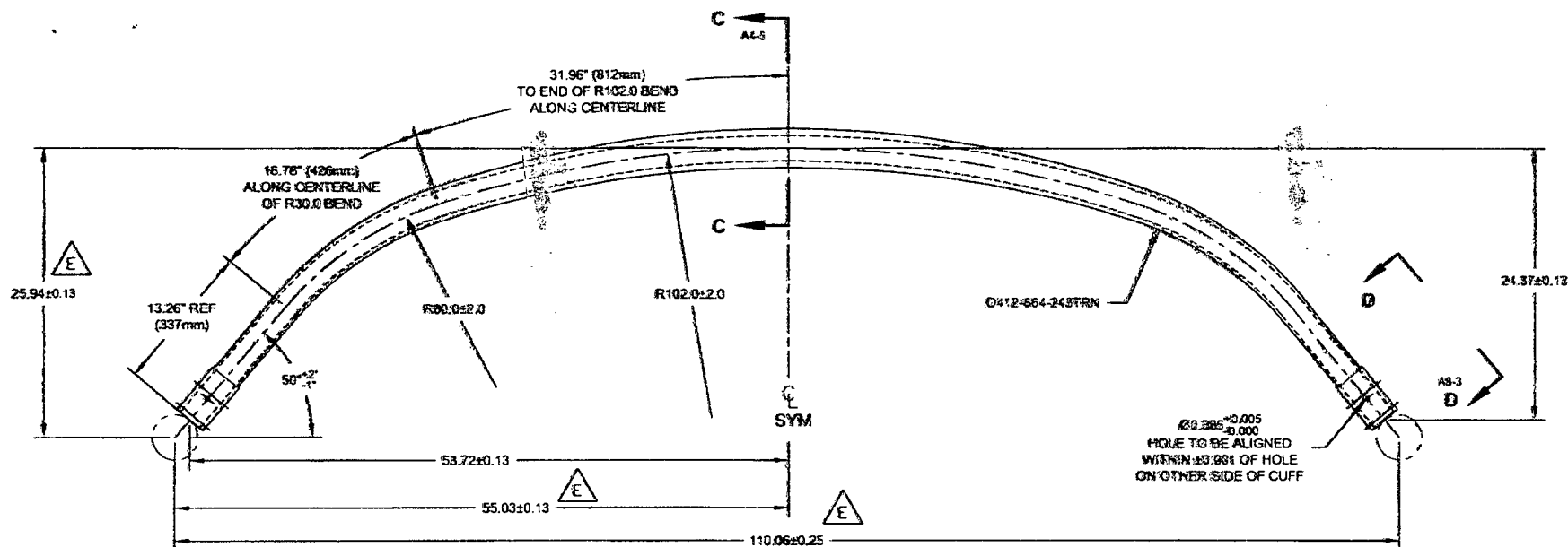


SECTION A-A
SCALE 4X

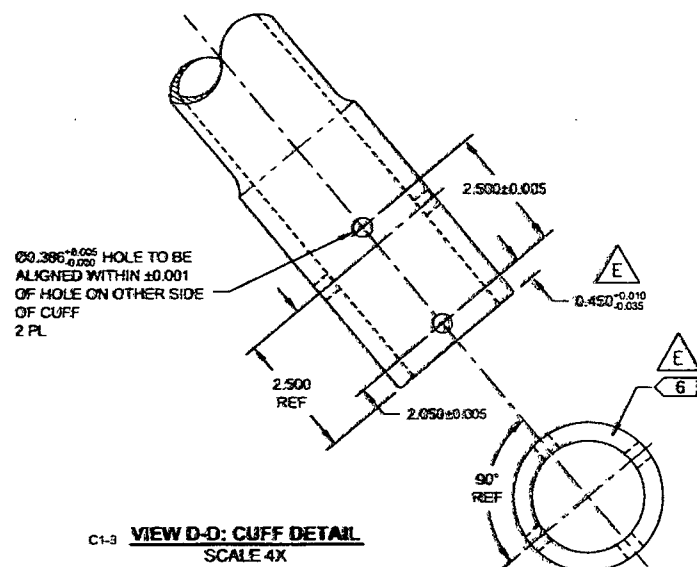
RELEASED
2009-10-29
NMP

W10 55131

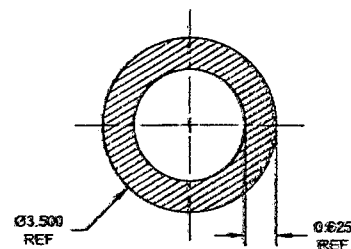
DESIGN	RF	DART AEROSPACE LTD	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	RF	DRAWING NO.	REV. E
MFG. APPR.	RF	D212-664-243	SHEET 2 OF 4
APPROVED	RF	TITLE	SCALE
DE APPR.	RF	CROSSTUBE ASSEMBLY (412 HI AFT)	NTS
DATE	09.09.30	<small>COPYRIGHT © 2001 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT NOT BE USED FOR ANY PURPOSE OR COPIED OR REPRODUCED IN ANY FORM WITHOUT THE WRITTEN PERMISSION FROM DART AEROSPACE LTD</small>	



D412-664-603 10
BENDING AND DRILLING DETAIL E



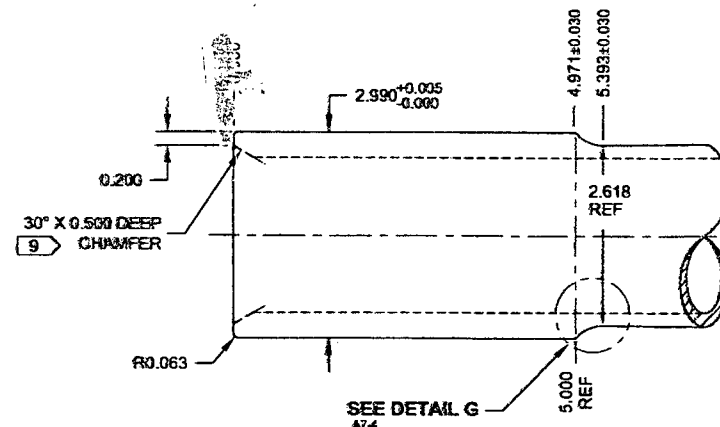
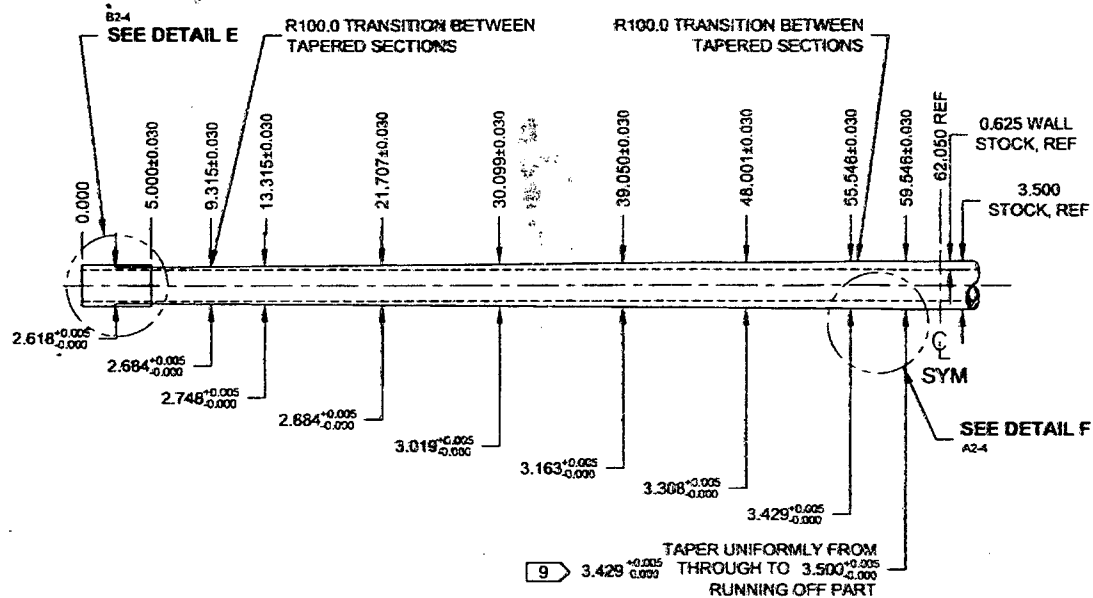
C1-3 **VIEW D-D: CUFF DETAIL**
 SCALE 4X



SECTION C-C 05-3
 SCALE 4X

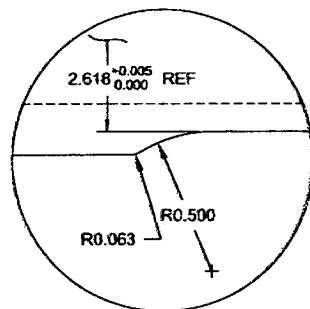
RELEASED
 2009-10-29
 MP

DESIGN	PH	DART AEROSPACE LTD	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	97	DRAWING NO.	REV. E
MFG. APPR.	18	D412-664-243	SHEET 3 OF 4
APPROVED	10	TITLE	SCALE
DE APPR.	11	CROSSTUBE ASSEMBLY (412 HI AFT)	NTS
DATE	09.09.30	<small>COPYRIGHT © 2001 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED UNDER A CONFIDENTIALITY AGREEMENT. IT IS NOT TO BE USED FOR ANY PURPOSES OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.</small>	

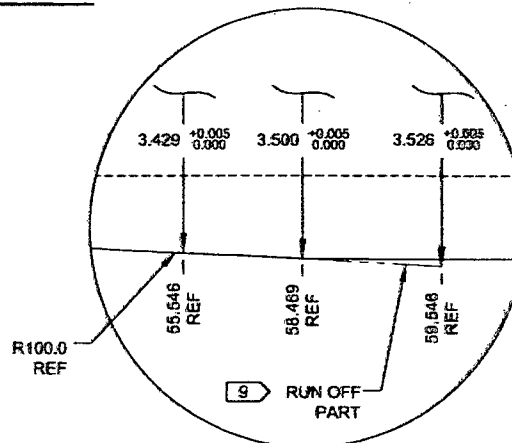


DETAIL E:
CROSSTUBE CUFF D6-4
SCALE SX

D412-664-243TRN
TURNING DETAIL



DETAIL G:
CUFF TRANSITION C1-4
SCALE 10X



DETAIL F:
TAPER RUN-OFF C4-4
NOT TO SCALE

RELEASED
2003-10-29
MTP

W/0 55131

DESIGN	PH	DART AEROSPACE LTD	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	PH	DRAWING NO.	REV. E
MFG. APPR.	PH	D412-664-243	SHEET 4 OF 4
APPROVED	PH	TITLE	SCALE
DE APPR.	PH	CROSSTUBE ASSEMBLY (412 H AFT)	NTS
DATE	09.09.30	COPYRIGHT © 2001 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL. NO DISSEMINATION OF THE CONTENTS OF THIS DOCUMENT IS TO BE MADE FOR ANY PURPOSE OR FOR COMMUNICATION TO ANY OTHER PERSON WITHOUT THE WRITTEN PERMISSION FROM DART AEROSPACE LTD.	

5.0 PARTS LIST

5.1 HIGH GEAR CROSSTUBES

Item	-101	-201	-203	Part Number	Description
	X			D212-664-101	CROSSTUBE INSTALLATION, 204/205/210/212/214/412, UH-1H, UH-1A/B/E/F/L/P, TH-1F/L, HH-1K HIGH FWD
		X		D212-664-201	CROSSTUBE INSTALLATION, 204/205/210/212/214, UH-1H, UH-1A/B/E/F/L/P, TH-1F/L, HH-1K HIGH AFT
			X	D412-664-203	CROSSTUBE INSTALLATION, 412 HIGH AFT
1	1			D212-664-141	CROSSTUBE ASSEMBLY, 204/205/210/212/214/412, UH-1H, UH-1A/B/E/F/L/P, TH-1F/L, HH-1K HIGH FWD
2		1		D212-664-241	CROSSTUBE ASSEMBLY, 204/205/210/212/214, UH-1H, UH-1A/B/E/F/L/P, TH-1F/L, HH-1K HIGH AFT
3			1	D412-664-243	CROSSTUBE ASSEMBLY, 412 HIGH AFT
10	2			* D2893-1	SUPPORT
11	4			* D3595-063-450	RUBBER CUSHION
12	4			* MS21920-25	CLAMP (OR MS21042-26)
13	4			AN6-35A	BOLT
14	4			AN6-36A	BOLT
15	6			MS21042L6	NUT (OR MS21042-6)
16	18			AN960JD616	WASHER
20		2		* D2940-1	SUPPORT
21		4		* D3595-063-530	RUBBER CUSHION
22		4		* MS21920-28	CLAMP (OR MS21042-30)
23		4		AN6-40A	BOLT
24		2		AN6-41A	BOLT
25		6		MS21042L6	NUT (OR MS21042-6)
26		18		AN960JD616	WASHER
30			1	* D2896-1	SUPPORT
31			2	* D2856-600-1009	ABRASION STRIP
32			2	* D3595-063-570	RUBBER CUSHION
33			4	* MS21920-28	CLAMP
34			2	* MS21920-30	CLAMP (OR MS21042-32)
35			4	AN6-40A	BOLT
36			2	AN6-41A	BOLT
37			6	MS21042L6	NUT (OR MS21042-6)
38			18	AN960JD616	WASHER
39			2	* D3189-1	CHAFING SHIELD
50	1	1		D3428-1	PLACARD

*REFERENCE ONLY. PARTS ARE INCLUDED IN D212-664-141/-241 OR D412-664-243 ASSEMBLIES ABOVE
NOTE: KITS INCLUDE EXTRA HARDWARE FOR COMPATIBILITY WITH BOTH DART AND BELL/AA
SKIDTUBES.

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Revision: F
Date: 08.09.05

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries



LIQUID PENETRANT TEST REPORT

P- 15315

CLIENT	<u>DART NEWSPACE</u>	DATE	<u>JANUARY 21-2010</u>	PAGE	<u>1</u>	OF	<u>1</u>
ATTENTION	<u>LINDA / CHANTEL</u>	ACUREN JOB NO.	<u>188-10-0046</u>	TIME	AM <input checked="" type="checkbox"/>	PM <input type="checkbox"/>	
ADDRESS	<u>1270 ABERDEEN ST</u>	PO/NO.	<u>11190</u>				
	<u>HACKESBURY O.D. K&H 1K7</u>	WORK LOCATION	<u>SHOP</u>				
		ACCEPTANCE STD.	<u>ASTM 1417</u>	REV./DATE	<u>2007</u>		
PROJECT	<u>F.P.I. ON 2 CROSS TUBES, 12</u>						
ITEM(S) EXAMINED	<u>1 MACHINED PARTS</u>						

JOB DESCRIPTION	PROCEDURE NO. <u>LT-0002</u>	REV./DATE	TECHNIQUE NO. <u>LT-TECH 2</u>	REV./DATE
PART NO.	<u>STAINLESS STEEL</u>	MATERIAL	<u>AUDINE ALUMINUM</u>	THICKNESS
SCOPE	<u>WET FLOW RESIST LIQUID PENETRANT</u> <u>INSPECTION CARRIED OUT 100% EXTERNAL</u>			

TEST DETAILS					
METHOD	<input checked="" type="checkbox"/> FLUORESCENT	<input type="checkbox"/> VISIBLE	<input checked="" type="checkbox"/> WATER WASH	<input type="checkbox"/> SOLVENT REMOVABLE	<input type="checkbox"/> POST EMULSIFIED
FAMILY BRAND	<u>MAGNAFLUX</u>		BLACK LIGHT S/N	<u>16457</u>	<input type="checkbox"/> OUTPUT > 1000 μ W/cm ²
PENETRANT	<u>ZL 67</u>	MINIMUM DWELL TIME	<u>1045</u> MIN.	LIGHTING EQUIP.	<input type="checkbox"/> FLASHLIGHT <input type="checkbox"/> TROUBLELIGHT
PENETRANT REMOVER	<u>H2O</u>	MINIMUM DRY TIME	<u>>10</u> MIN.	OTHER	<u>L.A.S. 20</u>
DEVELOPER	<u>SKD 52</u>	MINIMUM DWELL TIME	<u>10</u> MIN.	LIGHT METER S/N	<u>1098866</u>
DEVELOPER TYPE	<input checked="" type="checkbox"/> NON AQUEOUS	<input type="checkbox"/> AQUEOUS	<input type="checkbox"/> DRY	CAL DUE DATE	<u>10-1-23</u>

TEST SURFACE					
SURFACE CONDITION	<input type="checkbox"/> AS GROUND	<input type="checkbox"/> AS WELDED	<input checked="" type="checkbox"/> MACHINED	<input type="checkbox"/> SHOT BLASTED	<input type="checkbox"/> CLEAN BARE METAL
SURFACE TEMPERATURE	<input type="checkbox"/> < -4°C/ 20°F	<input type="checkbox"/> -4°C/ 20°F TO 10°C/50°F	<input checked="" type="checkbox"/> 10°C/50°F TO 52°C/125°F	<input type="checkbox"/> > 52°C/125°F	

RESULTS-	<input type="checkbox"/> METRIC <input type="checkbox"/> IMPERIAL
<u>12 STADS, -W.O. 54859 ✓</u>	
<u>1 CROSS TUBE, W.O. 55130 ✓</u>	
<u>1 CROSS TUBE, W.O. 55131 ✓</u>	
<u>ALL ITEMS HAVE BEEN FOUND ACCEPTABLE TO STANDARD. IN THIS REPORT.</u>	
<u>MM 10/01/25</u>	

Scope of Services
The agreement of Acuren Group Inc. to perform services extends only to those services provided for in writing. Under no circumstances shall such services extend beyond the performance of the requested services. It is expressly understood that all descriptions, comments and expressions of opinion reflect the opinions or observations of Acuren Group Inc. based on information and assumptions supplied by the owner/operator and are not intended nor can they be construed as representations or warranties. Acuren Group Inc. is not assuming any responsibilities of the owner/operator and the owner/operator retains complete responsibility for the engineering, manufacture, repair and use decisions as a result of the data or other information provided by Acuren Group Inc. In no event shall Acuren Group Inc.'s liability in respect of the services referred to herein exceed the amount paid for such services.

Standard of Care
In performing the services provided, Acuren Group Inc. uses the degree, care and skill ordinarily exercised under similar circumstances by others performing such services in the same or similar locality. No other warranty, expressed or implied, is made or intended by Acuren Group Inc.

SIGNATURES		DTR #	<u>E-27696</u>
CLIENT REPRESENTATIVE	<u>MATTHEW MURDOCH</u>	SIGNATURE	<u>Matthew Murdoch</u>
TECHNICIAN (SIGNATURE):	<u>Mike Jettus</u>	REPORT REVIEWED BY:	
NAME (PRINT):	<u>Mike Jettus</u>	NAME	INITIALS
CGSB LEVEL	<u>1</u>	CGSB LEVEL	<u>1</u>
CGSB REG. NO.	<u>6066</u>	CGSB REG. NO.	<u>6066</u>

WHITE - CLIENT COPY

CANARY - OFFICE COPY

PINK - TECHNICIAN COPY

GOLD - OFFICE COPY

PT Sept 2005



E- 27696

Form dated Sep 2005

Client: DART AEROSPACE
Contact: 1270 ABRAHAM ST, MARIETTA, GA
Location: 15 ABOVE
Description: F.P.I. - MACHINED PARTS, X-TUBES
Report #'s: —

Job #: _____
Day: Sun Mon Tues
P.O. #: _____
Vehicle # 579

Date: JAN 24 - 21 - 2010
 Wed Thurs Fri Sat
 W.O #: 188 - 10 - 0646
 Camera #: —

[illegible][illegible]

Film: _____ Pcs. 2 ¾ x 17"

_____ Pcs. 3 ½ x 17"

_____ Pcs. 4 ½ x 17"

_____ Pcs. 14" x 17"

_____ Pcs.

Consumables:

Equipment:

Client Representative: Matthew Mendenhall

Place a check mark in each safety check area as completed	
C/C	CAMERA CHECK
S/E	SAFETY EQUIPMENT CHECK
S/C	SURVEY METER CHECK
B/S	BARRRIER & SIGN INSTALLED
C/L	CAMERA LOCKED & SECURELY STORED
C/S	CAMERA SURVEYED AFTER EACH USE

EXPENSES

NOTES

ACUREN 1-877-299-2857

Oakville	(905) 825-8595 • Fax (905) 825-8598
Sarnia	(519) 336-3021 • Fax: (519) 336-8220
Sudbury	(705) 522-1849 • Fax (705) 522-9926
Halifax	(902) 497-3870 • Fax (902) 445-5090
North Bay	(705) 840-8107 • Fax (705) 476-6683
Val D'Or	(819) 856-6789 • Fax (819) 825-9564

Cambridge	(519) 622-3112 • Fax (519) 622-1326
Cornwall	(613) 931-1261 • Fax (613) 931-2777
Saint John	(506) 847-0194 • Fax (506) 847-0194
Thunder Bay	(807) 475-4240 • Fax (807) 577-2017
Gaspé	(418) 392-3618 • Fax (418) 392-4114
Hull	(819) 360-0685 • Fax (819) 827-3513